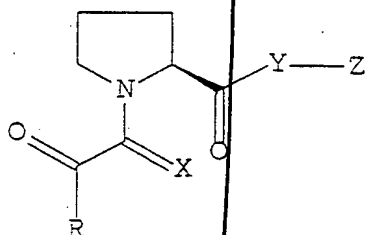


WHAT IS CLAIMED IS:

1. A method of revitalizing hair growth which comprises:  
administering to an animal an effective amount of a non-  
5 immunosuppressive pyrrolidine carboxylate compound.

2. The method of claim 1 wherein the pyrrolidine  
carboxylate is a compound of the formula:



I

wherein

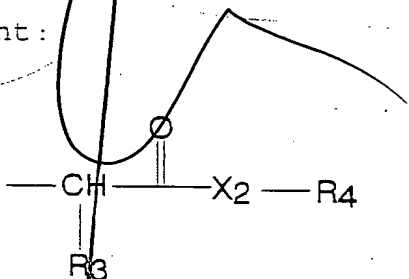
(R) is selected from the group consisting of a C<sub>1</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl group optionally substituted with C<sub>3</sub>-C<sub>6</sub> cycloalkyl, C<sub>3</sub> or C<sub>5</sub> cycloalkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkenyl, Ar<sub>1</sub>, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkenyl, or hydroxy, where Ar<sub>1</sub> is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sup>1</sup>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino:

X is selected from the group consisting of oxygen, sulphur, methylene ( $\text{CH}_2$ ), or  $\text{H}_2$ ;

Y is selected from the group consisting of oxygen or  $\text{NR}_2$ , where  $\text{R}_2$  is hydrogen or  $\text{C}^1\text{-C}_6$  alkyl; and

5 Z is selected from the group consisting of  $\text{C}_2\text{-C}_6$  straight or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with  $\text{Ar}_1$  as defined above,  $\text{C}_3\text{-C}_6$  cycloalkyl, cycloalkyl connected by a  $\text{C}_1\text{-C}_6$  straight or unbranched alkyl or alkenyl chain, and  $\text{Ar}_2$  is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl,  $\text{C}_1\text{-C}_6$  straight or branched alkyl or alkenyl,  $\text{C}_1\text{-C}_4$  alkoxy or  $\text{C}_1\text{-C}_4$  alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



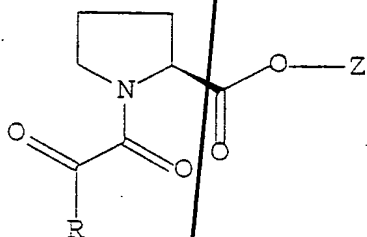
wherein

20  $\text{R}_3$  is a  $\text{C}_1\text{-C}_6$  straight or branched alkyl optionally substituted with  $\text{C}_3\text{-C}_6$  cycloalkyl, or  $\text{Ar}_1$  as defined above, and unsubstituted  $\text{Ar}_1$ ;

$\text{X}_2$  is O or  $\text{NR}_5$ , where  $\text{R}_5$  is selected from the group consisting of hydrogen,  $\text{C}_1\text{-C}_6$  straight or branched alkyl and alkenyl;

R<sub>4</sub> is selected from the group consisting of phenyl, benzyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, and C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically acceptable salts or hydrates thereof.

3. The method of claim 1 wherein the pyrrolidine carboxylate is a compound of the formula:



II

wherein

R<sub>1</sub> is a C<sub>1</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl group optionally substituted with C<sub>3</sub>-C<sub>6</sub> cycloalkyl, C<sub>3</sub> or C<sub>5</sub> cycloalkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkenyl, or Ar<sub>1</sub>, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkenyl, or hydroxy, and where Ar<sub>1</sub> is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino;

5  
10  
Z is a C<sub>2</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar<sub>1</sub> as defined above, C<sub>1</sub>-C<sub>6</sub> cycloalkyl, cycloalkyl connected by a C<sub>1</sub>-C<sub>6</sub> straight or unbranched alkyl or alkenyl chain, or Ar<sub>2</sub> where Ar<sub>2</sub> is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

4. The method of claim 1 wherein the pyrrolidine carboxylate compound is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

5 (1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

10 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

5 3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2-Pyridyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

25 3-(4-Pyridyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

5 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

10 3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)-2-pyrrolidinecarboxylate,

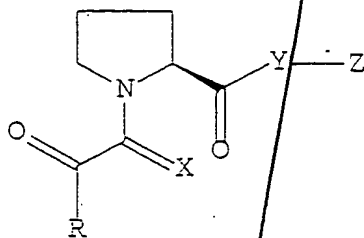
5 3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

20 3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, and mixtures thereof.

25 5. A method of promoting hair germination which comprises: administering to an animal an effective amount of a non-immunosuppressive pyrrolidine carboxylate compound.

6. The method of claim 5 wherein the pyrrolidine  
carboxylate is a compound of the formula:



I

wherein

5  $R_1$  is selected from the group consisting of a  $C_1$ - $C_6$  straight  
or branched chain alkyl or alkenyl group optionally  
substituted with  $C_3$ - $C_6$  cycloalkyl,  $C_3$  or  $C_5$  cycloalkyl,  $C_5$ - $C_6$   
cycloalkenyl,  $Ar_1$ , where said alkyl, alkenyl, cycloalkyl or  
cycloalkenyl groups may be optionally substituted with  $C_1$ - $C_4$   
10 alkyl,  $C_1$ - $C_4$  alkenyl, or hydroxy, where  $Ar_1$  is selected from  
the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl,  
3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-  
thienyl, 2-,3-,4-pyridyl, and phenyl, having one to three  
substituents which are independently selected from the  
15 group consisting of hydrogen, halo, hydroxyl, nitro,  
trifluoromethyl,  $C^1$ - $C_6$  straight or branched alkyl or  
alkenyl,  $C_1$ - $C_4$  alkoxy or  $C_1$ - $C_4$  alkenyloxy, phenoxy,  
benzyloxy, and amino:

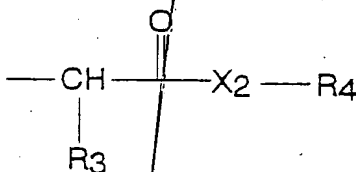
20 X is selected from the group consisting of oxygen,  
sulfur, methylene ( $CH_2$ ), or  $H_2$ ;

Y is selected from the group consisting of oxygen or  $NR_2$ ,  
where  $R_2$  is hydrogen or  $C^1$ - $C_6$  alkyl; and

Z is selected from the group consisting of  $C_2$ - $C_6$  straight

or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with Ar<sub>1</sub> as defined above, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, cycloalkyl connected by a C<sub>1</sub>-C<sub>6</sub> straight or unbranched alkyl or alkenyl chain, and Ar<sub>2</sub> is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



wherein

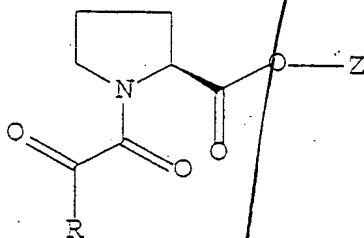
R<sub>3</sub> is a C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl optionally substituted with C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or Ar<sub>1</sub> as defined above, and unsubstituted Ar<sub>1</sub>;

X<sub>2</sub> is O or NR<sub>5</sub>, where R<sub>5</sub> is selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl and alkenyl;

R<sub>4</sub> is selected from the group consisting of phenyl, benzyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, and C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically acceptable salts or hydrates thereof.



7. The method of claim 5 wherein the pyrrolidine carboxylate is a compound of the formula:



II

wherein

5             $R_1$  is a  $C_1$ - $C_6$  straight or branched chain alkyl or alkenyl group optionally substituted with  $C_3$ - $C_6$  cycloalkyl,  $C_3$  or  $C_5$  cycloalkyl,  $C_5$ - $C_7$  cycloalkenyl, or  $Ar_1$ , where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  alkenyl, or hydroxy, and where  $Ar_1$  is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl,  $C_1$ - $C_6$  straight or branched alkyl or alkenyl,  $C_1$ - $C_4$  alkoxy or  $C_1$ - $C_4$  alkenyloxy, phenoxy, benzyloxy, and amino;

15             $Z$  is a  $C_2$ - $C_6$  straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with  $Ar_1$  as defined above,  $C_3$ - $C_6$  cycloalkyl, cycloalkyl connected by a  $C_1$ - $C_6$  straight or unbranched alkyl or alkenyl chain, (or  $Ar_2$  where  $Ar_2$  is selected

20

from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

8. The method of claim 5 wherein the pyrrolidine carboxylate is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

(1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-

dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-

dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)pyrrolidinecarboxylate,

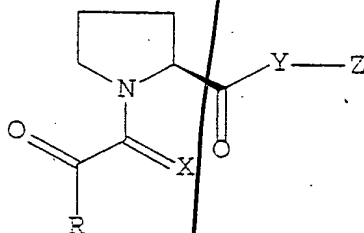
3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, or mixtures thereof.

9. A method of preventing hair loss which comprises: administering to an animal an effective amount of a non-immunosuppressive pyrrolidine carboxylate compound.

10. The method of claim 9 wherein the pyrrolidine carboxylate is a compound of the formula:



I

wherein

5  
10  
15  
20  
25  
30  
35  
40  
45  
50  
55  
60  
65  
70  
75  
80  
85  
90  
95  
100  
105  
110  
115  
120  
125  
130  
135  
140  
145  
150  
155  
160  
165  
170  
175  
180  
185  
190  
195  
200  
205  
210  
215  
220  
225  
230  
235  
240  
245  
250  
255  
260  
265  
270  
275  
280  
285  
290  
295  
300  
305  
310  
315  
320  
325  
330  
335  
340  
345  
350  
355  
360  
365  
370  
375  
380  
385  
390  
395  
400  
405  
410  
415  
420  
425  
430  
435  
440  
445  
450  
455  
460  
465  
470  
475  
480  
485  
490  
495  
500  
505  
510  
515  
520  
525  
530  
535  
540  
545  
550  
555  
560  
565  
570  
575  
580  
585  
590  
595  
600  
605  
610  
615  
620  
625  
630  
635  
640  
645  
650  
655  
660  
665  
670  
675  
680  
685  
690  
695  
700  
705  
710  
715  
720  
725  
730  
735  
740  
745  
750  
755  
760  
765  
770  
775  
780  
785  
790  
795  
800  
805  
810  
815  
820  
825  
830  
835  
840  
845  
850  
855  
860  
865  
870  
875  
880  
885  
890  
895  
900  
905  
910  
915  
920  
925  
930  
935  
940  
945  
950  
955  
960  
965  
970  
975  
980  
985  
990  
995

R<sub>1</sub> is selected from the group consisting of a C<sub>1</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl group optionally substituted with C<sub>3</sub>-C<sub>6</sub> cycloalkyl, C<sub>3</sub> or C<sub>5</sub> cycloalkyl, C<sub>5</sub>-C<sub>7</sub> cycloalkenyl, Ar<sub>1</sub>, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkenyl, or hydroxy, where Ar<sub>1</sub> is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sup>1</sup>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino:

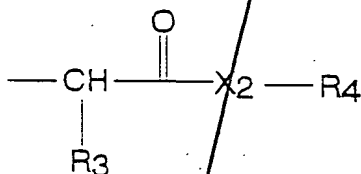
X is selected from the group consisting of oxygen, sulfur, methylene (CH<sub>2</sub>) or H<sub>2</sub>;

Y is selected from the group consisting of oxygen or NR<sub>2</sub>, where R<sub>2</sub> is hydrogen or C<sup>1</sup>-C<sub>6</sub> alkyl; and

Z is selected from the group consisting of C<sub>2</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with Ar<sub>1</sub> as defined above, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, cycloalkyl connected by a C<sub>1</sub>-C<sub>6</sub> straight or unbranched alkyl or alkenyl chain, and Ar<sub>2</sub> is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro,

trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



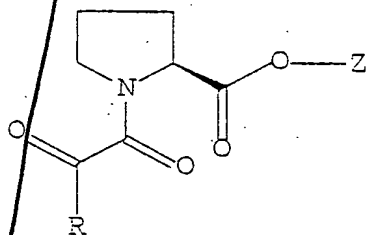
5 wherein

R<sub>1</sub> is a C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl <sup>#1-C<sub>6</sub></sup> optionally substituted with C<sub>1</sub>-C<sub>3</sub> cycloalkyl, or Ar<sub>1</sub> as defined above, and unsubstituted Ar<sub>1</sub>;

X<sub>2</sub> is O or NR<sub>5</sub>, where R<sub>5</sub> is selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl <sup>OR</sup> and alkenyl;

R<sub>4</sub> is selected from the group consisting of phenyl, benzyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, and C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically acceptable salts or hydrates thereof.

11. The method of claim 9 wherein the pyrrolidine carboxylate is a compound of the formula:



II

20 wherein

10

[illegible]

12. The method of claim 9 wherein the pyrrolidine carboxylate is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

5 3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3,-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

10 3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl(2S)-1-(3,3,dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

15 3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 (1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])entyl-2-pyrrolidinecarboxylate,

25 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,



3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

5 2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

10 3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

15 3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

20 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

25 3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)pyrrolidinecarboxylate,

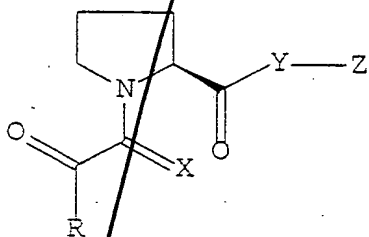
3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

5 3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, or pharmaceutically acceptable salts, hydrates, and mixtures thereof.

*Supernovus* 13. A method of treating alopecia which comprises:  
administering to an animal an effective amount of a non-  
10 immunosuppressive pyrrolidine carboxylate compound.

*13* 14. The method of claim 13 wherein the pyrrolidine carboxylate is a compound of the formula:



wherein

15  $R_1$  is selected from the group consisting of a  $C_1$ - $C_8$  straight or branched chain alkyl or alkenyl group optionally substituted with  $C_1$ - $C_8$  cycloalkyl,  $C_3$  or  $C_5$  cycloalkyl,  $C_5$ - $C_7$  cycloalkenyl,  $Ar_1$ , where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with  $C_1$ - $C_4$   
20 alkyl,  $C_1$ - $C_4$  alkenyl, or hydroxy, where  $Ar_1$  is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl,

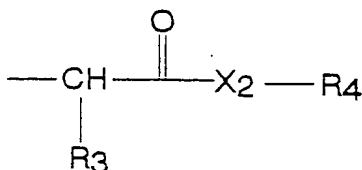
having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sup>1</sup>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino:

X is selected from the group consisting of oxygen, sulphur, methylene (CH<sub>2</sub>), or H<sub>2</sub>;

Y is selected from the group consisting of oxygen or NR<sub>2</sub>, where R<sub>2</sub> is hydrogen or C<sup>1</sup>-C<sub>6</sub> alkyl; and

Z is selected from the group consisting of C<sub>2</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with Ar<sub>1</sub> as defined above, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, cycloalkyl connected by a C<sub>1</sub>-C<sub>6</sub> straight or unbranched alkyl or alkenyl chain, and Ar<sub>2</sub> is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



wherein

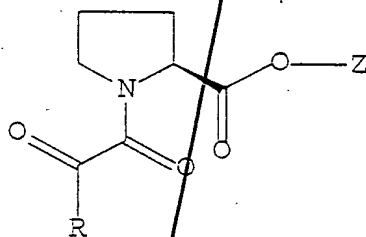
R<sub>3</sub> is a C<sub>1</sub>-C<sub>9</sub> straight or branched alkyl #<sub>1</sub>-C<sub>9</sub>

optionally substituted with C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or Ar<sub>1</sub> as defined above, and unsubstituted Ar<sub>1</sub>;

X<sub>2</sub> is O or NR<sub>5</sub>, where R<sub>5</sub> is selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl and alkenyl;

R<sub>4</sub> is selected from the group consisting of phenyl, benzyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, and C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically acceptable salts or hydrates thereof.

15. The method of claim 13 wherein the pyrrolidine carboxylate is a compound of the formula:



II

wherein

R<sub>1</sub> is a C<sub>1</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl group optionally substituted with C<sub>3</sub>-C<sub>8</sub> cycloalkyl, C<sub>3</sub> or C<sub>6</sub> cycloalkyl, C<sub>5</sub>-C<sub>6</sub> cycloalkenyl, or Ar<sub>1</sub>, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkenyl, or hydroxy, and where Ar<sub>1</sub> is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl,

having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino;

5  
Z is a C<sub>2</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar<sub>1</sub> as defined above, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, cycloalkyl connected by a C<sub>1</sub>-C<sub>6</sub> straight or unbranched alkyl or alkenyl chain, or Ar<sub>2</sub> where Ar<sub>2</sub> is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

10  
15  
16. The method of claim 13 wherein the pyrrolidine carboxylate compound is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3,-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-

dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

(1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-

pyrrolidinecarboxylate,

3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

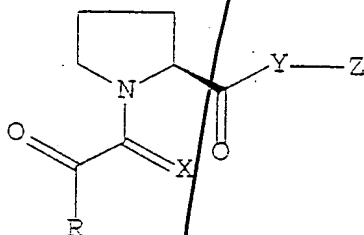
3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, and mixtures thereof.

17. A method of treating hair loss which comprises: administering to an animal an effective amount of a non-

immunosuppressive pyrrolidine carboxylate compound.

18. The method of claim 17 wherein the pyrrolidine carboxylate is a compound of the formula:



5 wherein

$R_1$  is selected from the group consisting of a  $C_1$ - $C_6$  straight or branched chain alkyl or alkenyl group optionally substituted with  $C_3$ - $C_6$  cycloalkyl,  $C_3$  or  $C_5$  cycloalkyl,  $C_5$ - $C_7$  cycloalkenyl,  $Ar_1$ , where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  alkenyl, or hydroxy, where  $Ar_1$  is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl,  $C^1$ - $C_6$  straight or branched alkyl or alkenyl,  $C_1$ - $C_4$  alkoxy or  $C_1$ - $C_4$  alkenyloxy, phenoxy, benzyloxy, and amino:

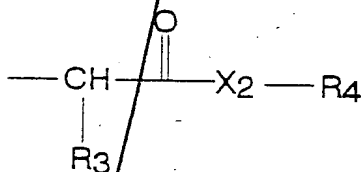
X is selected from the group consisting of oxygen, sulphur, methylene ( $CH_2$ ), or  $H_2$ ;

Y is selected from the group consisting of oxygen or  $NR_2$ , where  $R_2$  is hydrogen or  $C^1$ - $C_6$  alkyl; and



Z is selected from the group consisting of C<sub>2</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with Ar<sub>1</sub> as defined above, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, cycloalkyl connected by a C<sub>1</sub>-C<sub>6</sub> straight or unbranched alkyl or alkenyl chain, and Ar<sub>2</sub> is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



wherein

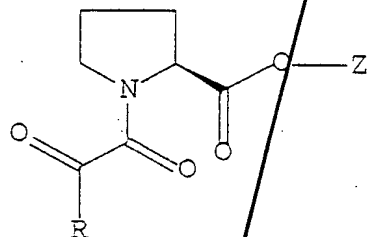
R<sub>3</sub> is a C<sub>1</sub>-C<sub>8</sub> straight or branched alkyl optionally substituted with C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or Ar<sub>1</sub> as defined above, and unsubstituted Ar<sub>1</sub>;

X<sub>2</sub> is O or NR<sub>5</sub>, where R<sub>5</sub> is selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl and alkenyl;

R<sub>4</sub> is selected from the group consisting of phenyl, benzyl, C<sub>1</sub>-C<sub>8</sub> straight or branched alkyl or alkenyl, and C<sub>1</sub>-C<sub>8</sub> straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically

acceptable salts or hydrates thereof.

19. The method of claim 17 wherein the pyrrolidine carboxylate is a compound of the formula:



II

wherein

$R_1$  is a  $C_1$ - $C_6$  straight or branched chain alkyl or alkenyl group optionally substituted with  $C_3$ - $C_6$  cycloalkyl,  $C_3$  or  $C_5$  cycloalkyl,  $C_5$ - $C_6$  cycloalkenyl, or  $Ar_1$ , where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  alkenyl, or hydroxy, and where  $Ar_1$  is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl,  $C_1$ - $C_6$  straight or branched alkyl or alkenyl,  $C_1$ - $C_4$  alkoxy or  $C_1$ - $C_4$  alkenyloxy, phenoxy, benzyloxy, and amino;

$Z$  is a  $C_2$ - $C_6$  straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with  $Ar_1$  as defined above,  $C_3$ - $C_6$  cycloalkyl, cycloalkyl connected by a  $C_1$ - $C_6$  straight or unbranched

alkyl or alkenyl chain, or Ar<sub>2</sub> where Ar<sub>2</sub> is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

AY  
ent

20. The method of claim 17 wherein the pyrrolidine carboxylate compound is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

(1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

5 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

10 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

15 2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

25 3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

5 3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

10 3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)pyrrolidinecarboxylate,

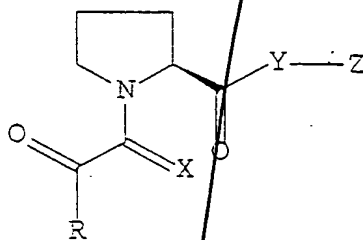
3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

15 3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates and mixtures thereof.

20 21. A method of treating hair loss associated with cancer therapy, wherein the cancer therapy is selected from the group consisting of radiation and chemotherapy, wherein said method comprises: administering to an animal an effective amount of a non-immunosuppressive pyrrolidine carboxylate compound.

22. The method of claim 21 wherein the pyrrolidine carboxylate is a compound of the formula:



I

wherein

5         $R_1$  is selected from the group consisting of a  $C_1$ - $C_6$  straight or branched chain alkyl or alkenyl group optionally substituted with  $C_3$ - $C_6$  cycloalkyl,  $C_3$  or  $C_5$  cycloalkyl,  $C_5$ - $C_7$  cycloalkenyl,  $Ar_1$ , where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  alkenyl, or hydroxy, where  $Ar_1$  is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl,  $C^1$ - $C_6$  straight or branched alkyl or alkenyl,  $C_1$ - $C_4$  alkoxy or  $C_1$ - $C_4$  alkenyloxy, phenoxy, benzyloxy, and amino:

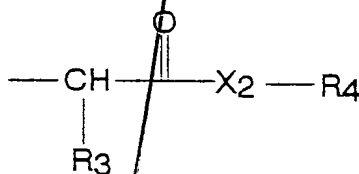
10  
15  
20         $X$  is selected from the group consisting of oxygen, sulphur, methylene ( $CH_2$ ), or  $H_2$ ;

$Y$  is selected from the group consisting of oxygen or  $NR_2$ , where  $R_2$  is hydrogen or  $C^1$ - $C_6$  alkyl; and

$Z$  is selected from the group consisting of  $C_2$ - $C_6$  straight

or branched chain alkyl or alkenyl,

wherein the alkyl chain is substituted in one or more positions with Ar<sub>1</sub> as defined above, C<sub>3</sub>-C<sub>8</sub> cycloalkyl, cycloalkyl connected by a C<sub>1</sub>-C<sub>6</sub> straight or unbranched alkyl or alkenyl chain, and Ar<sub>2</sub> is selected from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, and phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; Z may also be the fragment:



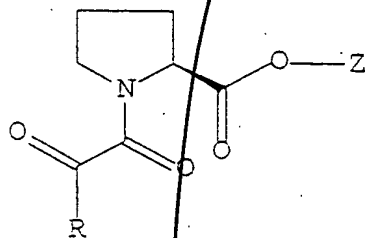
wherein

R<sub>3</sub> is a C<sub>1</sub>-C<sub>8</sub> straight or branched alkyl optionally substituted with C<sub>3</sub>-C<sub>8</sub> cycloalkyl, or Ar<sub>1</sub> as defined above, and unsubstituted Ar<sub>1</sub>;

X<sub>2</sub> is O or NR<sub>5</sub>, where R<sub>5</sub> is selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl and alkenyl;

R<sub>4</sub> is selected from the group consisting of phenyl, benzyl, C<sub>1</sub>-C<sub>8</sub> straight or branched alkyl or alkenyl, and C<sub>1</sub>-C<sub>8</sub> straight or branched alkyl or alkenyl substituted with phenyl; or pharmaceutically acceptable salts or hydrates thereof.

23. The method of claim 21 wherein, the pyrrolidine carboxylate is a compound of the formula:



wherein

5           R<sub>1</sub> is a C<sub>1</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl group optionally substituted with C<sub>3</sub>-C<sub>6</sub> cycloalkyl, C<sub>3</sub> or C<sub>6</sub> cycloalkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkenyl, or Ar<sub>1</sub>, where said alkyl, alkenyl, cycloalkyl or cycloalkenyl groups may be optionally substituted with C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkenyl, or hydroxy, and where Ar<sub>1</sub> is selected from the group consisting of 1-naphthyl, 2-naphthyl, 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro, trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino;

10           Z is a C<sub>2</sub>-C<sub>6</sub> straight or branched chain alkyl or alkenyl, wherein the alkyl chain is substituted in one or more positions with Ar<sub>1</sub> as defined above, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, cycloalkyl connected by a C<sub>1</sub>-C<sub>6</sub> straight or unbranched alkyl or alkenyl chain, or Ar<sub>2</sub>, where Ar<sub>2</sub> is selected



AS  
from the group consisting of 2-indolyl, 3-indolyl, 2-furyl, 3-furyl, 2-thiazolyl, 2-thienyl, 3-thienyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, or phenyl, having one to three substituents which are independently selected from the group consisting of hydrogen, halo, hydroxyl, nitro trifluoromethyl, C<sub>1</sub>-C<sub>6</sub> straight or branched alkyl or alkenyl, C<sub>1</sub>-C<sub>4</sub> alkoxy or C<sub>1</sub>-C<sub>4</sub> alkenyloxy, phenoxy, benzyloxy, and amino; or pharmaceutically acceptable salts or hydrates thereof.

10 24. The method of claim 21 wherein the pyrrolidine carboxylate compound is selected from the group consisting of:

3-phenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

15 3-phenyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3,4,5-trimethoxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 3-(4,5-methylenedioxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(4,5-methylenedioxyphenyl)-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

25 3-cyclohexyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-cyclohexyl-1-prop-2-(E)-enyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

(1R)-1,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-

dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-furanyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thienyl])ethyl-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2-[2-thiazolyl])ethyl-2-pyrrolidinecarboxylate,

AS 3-phenyl-1-propyl (2S)-1-(1,2-dioxo-2,phenyl)ethyl-2-pyrrolidinecarboxylate,

10 3-(2,5-dimethoxyphenyl)-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2,5-dimethoxyphenyl)-1-prop-2-(E)-enyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

15 2-(3,4,5-trimethoxyphenyl)-1-ethyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(2-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

20 3-(4-Pyridyl)-1-propyl(2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

25 3-phenyl-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-phenyl-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexylethyl-1,2-

dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-tert-butyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3,3-diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxopentyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-1-(2-cyclohexyl-1,2-dioxoethyl)-2-pyrrolidinecarboxylate,

3-(3-Pyridyl)-1-propyl (2S)-N-([2-thienyl]glyoxyl)pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-(3,3-dimethyl-1,2-dioxobutyl)-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-cyclohexylglyoxyl-2-pyrrolidinecarboxylate,

3,3-Diphenyl-1-propyl (2S)-1-(2-thienyl)glyoxyl-2-pyrrolidinecarboxylate, and pharmaceutically acceptable salts, hydrates, and mixtures thereof.